

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
1 April 2004 (01.04.2004)

PCT

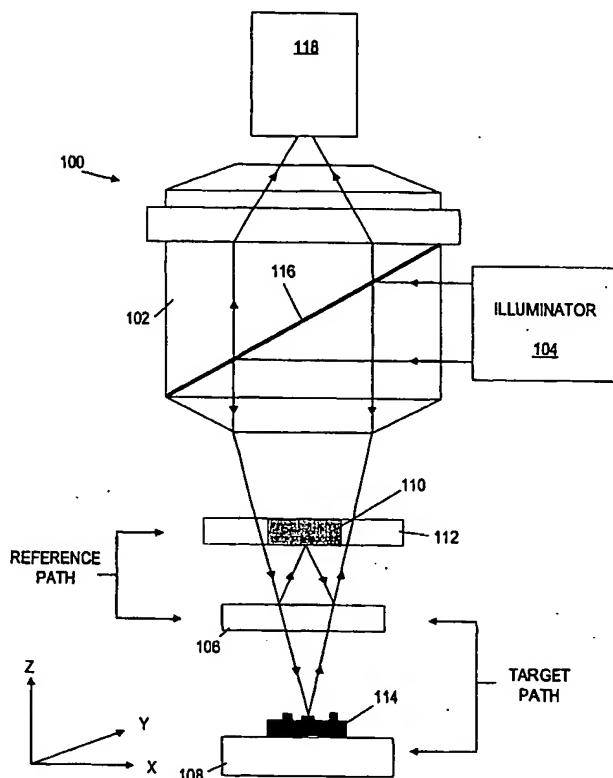
(10) International Publication Number  
**WO 2004/027686 A2**

(51) International Patent Classification<sup>7</sup>: **G06K**  
(21) International Application Number:  
PCT/US2003/029946  
(22) International Filing Date:  
23 September 2003 (23.09.2003)  
(25) Filing Language: English  
(26) Publication Language: English  
(30) Priority Data:  
60/412,827 23 September 2002 (23.09.2002) US  
(71) Applicant (for all designated States except US):  
WILLIAM MARSH RICE UNIVERSITY [US/US];  
6100 Main Street, Houston, TX 77005 (US).

(71) Applicants and  
(72) Inventors: CONRAD, Pamela, G. [US/US]; 5791 Cameo  
Street, Alta Loma, CA 91701 (US). ADLEMAN, Leonard  
[US/US]; Department of Computer Science - SAL 316,  
Mail Code 0782SAL200, 941 West 37th Place, Los Ange-  
les, CA 90089-0781 (US).  
(72) Inventors; and  
(75) Inventors/Applicants (for US only): LUTTGE, Andreas  
[DE/US]; 21211 Ganton Drive, Katy, TX 77450 (US).  
SAWYER, Dale, S. [US/US]; 1424 Missouri Street,  
Houston, TX 77006 (US).  
(74) Agents: WATKINS, Marcella, D. et al.; Conley Rose,  
P.C., P.O. Box 3267, Houston, TX 77253-3267 (US).  
(81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE,  
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,  
KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,  
MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT,

[Continued on next page]

(54) Title: NON-DESTRUCTIVE OPTICAL IMAGING SYSTEM FOR ENHANCED LATERAL RESOLUTION



(57) Abstract: In some embodiments, an optical imaging system comprises a non-destructive optical device that obtains information concerning a target object and a X,Y positioning system that is capable of positioning one or both of the target object and the optical device to pre-determined offset locations more closely spaced than the obtainable resolution of the optical device. A first "base" image is produced and then overlapping additional images may be produced by the positioning one or both of the target object and the optical device to the pre-determined locations. The first image and the additional images may be combined to produce a single combined image that contains inherently more information than the first image or any of the additional images alone. The combined image then may be digitally restored and enhanced to produce an image with a greater resolution than the optical device yields.

WO 2004/027686 A2



RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,  
TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— without international search report and to be republished upon receipt of that report

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*